

WE CLAIM:

1. A method for determining contact coplanarity of packaged semiconductor devices having a plurality of contacts, comprising the steps of:

5 measuring the relative positions of said contacts on a subject semiconductor device;

 calculating from said measurements seating planes formed by tilting said device to one or more of its corners and/or sides such that each said plane comprises contacts at or adjacent to the corners of said device;

10 using said measured relative contact positions and said calculated seating planes to determine the highest deviation from contact coplanarity for said semiconductor device.

2. The method of Claim 1, wherein said step of measuring comprises measuring the
15 relative positions of said contacts using a 3-point seating plane method.

3. The method of Claim 1, wherein said contacts are leads extending in a gull-wing pattern from said packaged semiconductor device.

20 4. The method of Claim 1, wherein said contacts are solder balls attached to a bottom side of said packaged semiconductor device.

5. A method for screening for contact coplanarity packaged semiconductor devices having a plurality of contacts, comprising the steps of:

25 measuring the relative positions of said contacts on a subject semiconductor device;

 calculating from said measurements seating planes formed by tilting said device to one or more of its corners and/or sides such that each said plane comprises contacts at or adjacent to the corners of said device;

30 using said measured relative contact positions and said calculated seating planes to determine the highest deviation from contact coplanarity for said semiconductor device; and

 comparing said highest deviation from contact coplanarity to a pre-determined specification.

6. The method of Claim 5, further comprising the step of sorting packaged semiconductor devices that have a highest deviation at or in excess of said pre-determined specification from packaged semiconductor devices that have a highest deviation less than said pre-determined specification.

7. The method of Claim 5, wherein said step of measuring comprises measuring the relative positions of said contacts using a 3-point seating plane method.

8. The method of Claim 5, wherein said contacts are leads extending in a gull-wing pattern from said packaged semiconductor device.

9. The method of Claim 5, wherein said contacts are solder balls attached to a bottom side of said packaged semiconductor device.

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10. A semiconductor test apparatus, comprising:

a tool operable to measure the relative positions of contacts on a packaged semiconductor device;

a computer operable to use said relative positions to determine seating planes formed by tilting said device to one or more of its corners and/or sides such that each said plane comprises contacts at or adjacent to the corners of said device; said computer further operable to calculate a highest deviation from contact coplanarity using said measured relative contact positions and said seating planes.

11. The apparatus of Claim 10, where said computer is further operable to compare said highest deviation from contact coplanarity to a pre-determined specification.

12. The apparatus of Claim 11, further comprising a device for separating packaged semiconductor devices having deviations from contact coplanarity that exceed said pre-determined specification from packaged semiconductor devices that do not exceed said pre-determined specification.

13. The apparatus of Claim 10, wherein said contacts on a packaged semiconductor device comprise leads extending in a gull-wing pattern from said device.

14. The apparatus of Claim 10, wherein said contacts on a packaged semiconductor device comprise solder balls extending from a bottom side of said device.

ABSTRACT OF THE DISCLOSURE

A method for determining contact coplanarity of packaged semiconductor devices having a plurality of contacts. The method includes the steps of measuring the relative
5 positions of the contacts on a subject semiconductor device; calculating from the measurements seating planes 64 formed by tilting the device to one or more of its corners and/or sides such that each said plane comprises contacts at or adjacent to the corners of the device; using the measured relative contact positions and the calculated seating planes to determine the highest deviation from contact coplanarity for the
10 semiconductor device.